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	Titolo	Dynamic Data Analysis : Modeling Data with Differential Equations / / by James Ramsay, Giles Hooker
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	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	1 Introduction to Dynamic Models -- 2 DE notation and types -- 3 Linear Differential Equations and Systems -- 4 Nonlinear Differential Equations -- 5 Numerical Solutions -- 6 Qualitative Behavior -- 7 Trajectory Matching -- 8 Gradient Matching -- 9 Profiling for Linear Systems -- 10 Nonlinear Profiling -- References -- Glossary -- Index.
	Sommario/riassunto	This text focuses on the use of smoothing methods for developing and estimating differential equations following recent developments in functional data analysis and building on techniques described in Ramsay and Silverman (2005) Functional Data Analysis. The central concept of a dynamical system as a buffer that translates sudden changes in input into smooth controlled output responses has led to applications of previously analyzed data, opening up entirely new opportunities for dynamical systems. The technical level has been kept low so that those with little or no exposure to differential equations as modeling objects can be brought into this data analysis landscape.

There are already many texts on the mathematical properties of ordinary differential equations, or dynamic models, and there is a large literature distributed over many fields on models for real world processes consisting of differential equations. However, a researcher interested in fitting such amodel to data, or a statistician interested in the properties of differential equations estimated from data will find rather less to work with. This book fills that gap. Offers an accessible text to those with little or no exposure to differential equations as modeling objects Updates and builds on techniques from the popular Functional Data Analysis (Ramsay and Silverman, 2005) Opens up new opportunities for dynamical systems and presents additional applications for previously analyzed data Jim Ramsay, PhD, is Professor Emeritus of Psychology and an Associate Member in the Department of Mathematics and Statistics at McGill University. He received his PhD from Princeton University in 1966 in quantitative psychology. He has been President of the Psychometric Society and the Statistical Society of Canada. He received the Gold Medal in 1998 for his contributions to psychometricsand functional data analysis and Honorary Membership in 2012 from the Statistical Society of Canada. Giles Hooker, PhD, is Associate Professor of Biological Statistics and Computational Biology at Cornell University. In addition to differential equation models, he has published extensively on functional data analysis and uncertainty quantification in machine learning. Much of his methodological work is inspired by collaborations in ecology and citizen science data.